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ABSTRACT

Special education teachers (N=167), teacher trainees (N=122), and administrators (N=8) responded to questionnaires regarding their commitment to acquiring basic microcomputer skills. Teachers believed that they were worth more than their current salaries, and that districts could afford to pay them more to aid them in, and as a reward for, the acqusisition of new skills. Administrators, however, believed that the districts had difficulties paying teachers more. Teachers' interest in microcomputers was matched to their desire to enroll in coursework to learn these skills. Administrators were equally interested but did not view coursework as the approach of choice. Teachers considered that microcomputer skills were related to instruction of handicapped children more clearly than did teacher trainees. Administrators perceived different uses for microcomputers than either group. Teachers wanted at least part of the course costs paid by their districts. Deterrants to learning microcomputer skills included shortage of time, time conflicts, and doubts about microcomputer availability. (CL)

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Final Summary Project Report

THE DEVELOPMENT OF MICROCOMPUTER SKILLS OF SPECIAL EDUCATION TEACHERS

Conducted partly with funding from the
Research in Education
of the Handicapped Program,
United States Department of Education
Project No. 023LH30056

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Final Summary Project Report

The Development of Microcomputer Skills of Special Education Teachers

Purposes of the Project

The general purposes of the project were to realistically assess the variables related to the use of microcomputer technology by special educators and to identify some means to overcome barriers which prevent interested special education teachers from developing microcomputer skills.

The four specified purposes of this project were 1) to identify variables related to the use of microcomputer technology which affect special educators; 2) to compare the effectiveness of two experimental procedures designed to overcome identified barriers to the acquisition of this technology by special educators; 3) to produce a monograph for special educators who may not have access to formal classroom instruction in the use of the microcomputer; and 4) to disseminate research findings, and other products.

Method

In order to identify the primary variables affecting teacher commitment to acquiring basic microcomputer skills, 200 questionnaires (and microcomputer course offerings announcements) were sent to a population of special education teachers randomly chosen from the Illinois Board of Education roster, and to 150 randomly chosen junior and senior level special education teacher trainees. Forty-two special education administrators were sent a questionnaire designed to elicit their perceptions regarding the importance of microcomputer knowledge in their districts. The perceptions of the teachers, teacher trainees, and administrators were compared for congruence and divergence.

A scheduling program (TRS-80) for half the students in the Trainable Mentally Handicapped sequence in special education had been designed before the research proposal was submitted. A decision to change to Apple computers was made later as these appeared to be better suited to

education. The scheduling program was translated and expanded to accomodate all students in the trainable mentally handicapped specialty. Because of technical and personnel difficulties the program was never used beyond a small pilot group of students. Before the program could be more broadly used, the University insituted a system of computerized scheduling for ALL students, obviating any possible control group.

Microcomputer courses were offered both academic semesters to groups of teachers, administrators, and special education majors. The offering of these courses and the scheduling program were designated as experimental procedures to attempt to identify and ameliorate some of the barriers associated with the acquisition of this technology by special educators: Comparison of the efficacy of these two approaches became impossible when universal scheduling was instituted.

Selected Survey Questions - Teachers

3. Average income level for families within your school district
   Scale 1 (low) - 7 (high)
4. Could district pay more ? Scale 1(no) - 7(yes)
5. How interested does your district appear to be in the use of microcomputers for classroom instruction at the present time ?
   Scale 1(not) - 7(very)
6. How interested will your district be in the use of microcomputers within 5 years?
7. To what extent is instruction in the use of microcomputers being provided by your district at the present time? Scale 1(none) - 7(adequate)
8. To what extent is such instruction planned within the next few years?
13. Overall years of teaching experience
14. Years of experience with the category of students you presently teach
15. Years of experience with this age level of students
19. Age
24. Approximate salary for this school year
25. Is your salary high enough for what you do? Scale 1(no) - 7 (yes)
27. How interested are you in using the microcomputer in your professional work? Scale 1(not) - 7(very)
29. How would you rate your microcomputer skill/knowledge?
    0 - Have no experience, don't know where to begin
    1 - Can operate a video game program
    2 - Can operate a simple administrative or education-related program
    3 - Can use a "shell" or "author"-type program

4 - Can alter a simple administrative or educational program
5 - Can write a simple administrative or educational program
6 - Can write a more complex program

30. How important do you think that you school district considers YOUR use of microcomputer or learning to use a microcomputer at this time Scale 1(not) - 7(very)
31. How much consideration is given by your administration to knowledge of the microcomputer in the hiring of new staff or in the tenuring or advancement of present staff? Scale 1(none) - 7(much)
35. How interested are you in enrolling in a microcomputer course? Scale 1(not) - 7(very)

Selected Survey Questions - Undergraduate Students

1. Age
9. Credit hours completed
10. Approximate over-all grade point average
18. Average number of hours you work per week
19. Number of credit hours in which you are enrolled
33. How interested do you think shcool districts/principals are in finding teachers who can use microcomputers? Scale 0(not) - 9(very)
34. How interested are you in using the microcomputer in your professional work? Scale 0(not) - 9(very)
37. How would you rate your microcomputer skill/knowledge?
    0 - Have no experience, don't know where to begin
    1 - Can operate a video game program
    2 - Can operate a simple administrative or education-related program
    3 - Can use a "shell" or "author"-type program
    4 - Can alter a simple administrative or educational program
    5 - Can write a simple administrative or educational program
    6 - Can write a more complex program
48. How interested are you in enrolling in a microcomputer course? Scale 0(not) - 9(very)

Selected Survey Questions - Administrators

3. Average income level for families within your school district Scale 1 (low) - 7 (high)
4. Could district pay more ? Scale 1(no) - 7(yes)
5. How interested does your district appear to be in the use of microcomputers for classroom instruction at the present time ? Scale 1(not) - 7(very)

6. How interested will your district be in the use of microcomputers within 5 years?
7. To what extent is instruction in the use of microcomputers being provided by your district at the present time? Scale 1(none) - 7(adequate)
8. To what extent is such instruction planned within the next few years?
13. Total years of teaching experience
15. Years of experience at present position
19. Age
20. Sex
24. Salary for this school year
25. Is your salary high enough for what you do? Scale 1(no) - 7(yes)
27. How interested are you in using the microcomputer in your professional work? Scale 1(not) - 7(very)
29. How would you rate your microcomputer skill/knowledge?
    0 - Have no experience, don't know where to begin
    1 - Can operate a video game program
    2 - Can operate a simple administrative or education-related program
    3 - Can use a "shell" or "author"-type program
    4 - Can alter a simple administrative or educational program
    5 - Can write a simple administrative or educational program
    6 - Can write a more complex program
30. How important do you think that your school district considers YOUR use of microcomputer or learning to use a microcomputer at this time Scale 1(not) - 7(very)
31. How much consideration is given by your administration to knowledge of the microcomputer in the hiring of new staff or in the tenuring or advancement of present staff? Scale 1(none) - 7(much)
35. How interested are you in enrolling in a microcomputer course? Scale 1(not) - 7(very)

In addition to these scalable or quantifiable questions, the surveys solicited categorical information, rank order choices, and included some open-ended statements.

Results

Of the 200 teachers' questionnaires, 167 were returned; of the 150 students', 122. Of the 48 questionnaires mailed to special education administrators, only eight (8) were returned, and those over a six months period. Summaries of data are presented in narrative and tabular form.

Teachers

As shown in Table No. 1, the teachers averaged nine (9) years of teaching expericne (range 1-31 years), seven years experience with the category of special education students with which they were presently working, and almost seven years of experience with students at their present students' age levels. Their average age was 33 years, average salary $17,000 for a nine months year.These teachers were seasoned professionals, having proved their competence and developed an understanding of their districts' probable reaction to innovations such as the use of microcomputers. They estimated their districts' interest in the use of microcomputers to be quite high (5 on a scale of 1-7) and expected the interest to increase over the next five years (6 on a scale of 1-7). While they perceived their districts as offering about an average amount of microcomputer instruction at the present time (3.8 on a scale of 1-7), they expected the amount of instruction to be increased in the near future (to 5.5).

Teachers perceived the family incomes in their districts to be somewhat above average (4 on a scale of 1-7). The majority of the teachers felt that their districts did not pay them what they were worth, and that the district could pay more. Their perception of the districts' concern or pressure for them to use microcomputers was about 3.6 on a scale of 1-7. Their rating of their districts' concern for the use of microcomputers as it would be reflected in teacher evaluations or in the choosing of new teachers to the district was somewhate lower, 2.4 on a scale of 1-7.

Regarding their personal interest in using microcomputers in their profession, the teachers averaged a high rate of interest, 5.5 on the 1-7 scale. They rated their microcomputer skill level considerably lower, 2.0 on the 1-7 scale. They expressed a strong desire to enroll in microcomputer coursework, 5.1 on a 1-7 scale. Of these teachers, 35% stated that they had had no microcomputer instruction, 9% had had minimal instruction, 27% had attended a microcomputer workshop, 23% had already had some coursework, and 6% responded as being self-taught. Reasons given for being interested in learning to use the microcomputer were: none, 6%; appropriate for students, 42%; would assist teacher, 25%; increased marketability, 4%; and job requirement, only 1%. Reasons given for NOT being interested in learning to use the microcomputer were: none, 34%; problems with computer availability, 16%; and time or schedule conflicts, 13%.

Responses to the question "what conditions would be necessary for you to enroll in a microcomputer course?" included: tuition paid, 26%; materials

TABLE NO. 1.
TEACHERS' RESPONSES TO SURVEY QUESTIONS

Descr. of Variable	Sample Size	Sample Mean	Sample Variance	Standard Deviation	Range	S.E. of Mean
Fam. Inc.	138	4.033	1.030	1.015	1-7	.087
Higher Sal.	157	5.013	3.172	1.781	1-7	.143
Sch.Int.	165	5.124	2.368	1.539	1-7	.120
5 Yr Int.	154	6.143	1.213	1.102	1-7	.000
Instruct.	142	3.838	3.474	1.864	1-7	.157
Fut. Instr.	97	5.490	2.155	1.468	1-7	.150
Teach. Exp.	167	9.105	36.446	6.037	1-31	.469
Categ. Exp.	163	7.442	25.655	5.065	1-31	-
Age Lev. Ex.	164	6.979	26.230	5.122	1-28	-
Age	165	33.130	60.845	7.800	22-57	.609
Sal.(Thous)	160	17	21	5	4-38	.369
Paid Worth	164	2.451	3.211	1.792	1-7	.140
Micro Intr	165	5.524	2.760	1.661	1-7	.000
Micr Skill	166	2.012	2.361	1.537	0-6	.120
Sch Cares	167	3.593	3.664	1.914	1-7	.149
Mic in Eval & New Staff	139	2.439	2.322	1.524	1-7	.130
Course In	167	5.090	3.399	1.844	1-7	.143

and fees paid, 14%; and easy grading, 7%. Desired rewards included: more access to microcomputers, average 2.3 on scale of 1-7; and higher salary, average 1.6 on scale of 1-7. When asked to name three skills in priority which they would like to learn, 17% of the teachers listed microcomputer skills as their first choice; 14% listed such skills as their second choice; and 9% listed them as their third choice.

Students

As shown in Table No. 2, the average age of the students was 23.80. The majority of the students had completed more than half their programs, having an average of 65 credit hours of a required 120 hours. The grade point average of these students was 3.03 on a 4.00 scale. The mean number of hours worked per week was 7.8, with a wide range of 0-48. The students averaged a course load of 15 credit hours, the university expected load. Student perception of the value that school districts place on having microcomputer skills was quite high, 6 on a scale of 0-9. Their perception of their own microcomputer skill was much lower, 1.39 on a scale of 0-6. Their interest in taking a course in

microcomputer paralleled their interest, at 6.43 on a 0-9 scale.

TABLE NO. 2
STUDENTS' RESPONSES TO SURVEY QUESTIONS

Descr. of Variable	Sample Size	Sample Mean	Sample Variance	S. E. of Sample	Range	S.E. of Mean
Age	121	23.80	7.227	2.688	18-42	.245
Credit Hrs	116	65.145	293.	17.117	16-107	-
GPA	117	3.031	.2269	.4764	2.0-4.0	-
Work Hrs.	115	7.843	96.828	9.840	0-48	-
Sem. Hrs.	122	15.443	5.066	2.251	0-20	-
Micro in Eval & New Staff	120	6.083	3.922	1.980	0-9	.182
Student Micro Int	120	6.117	4.778	2.186	0-9	.201
Student Mcr Skill	121	1.397	1.561	1.250	0-6	.114
Course Int	117	6.431	5.162	2.272	0-9	.211

Of the students 55% stated that they had had no instruction in the use of microcomputers; 31% reported minimal instruction; 2% had attended a microcomputer workshop; 4% had taken a course; and 2% reported themselves as self-taught. When asked to list three skills they would most like to learn, 47% listed special education skills first, 8% listed general professional skills first, 1% listed regular education skills as second priority, and about 10% listed general professional skills as last choice.

When students were asked for reasons that they might be interested in learning microcomputer skills, 24% stated that they had no special reason, 26% said they would assist pupils, 12% said they needed them in order to be teachers, 13% listed marketability, and 6% indicated such skill to be a job requirement. When asked for reasons that they might NOT be interested in learning microcomputer skills, 64% responded that they had no reasons, 2% doubted the availability of computers, 8% stated that they had time or school conflcts, and 8% listed fear as a deterrent. Regarding conditions that would be necessary for students to take a microcomputer course, 15% indicated that tuition would have to be paid; 22% stated that materials and fees would have to be paid; and 20% would require easy grading. Rewards desired for learning microcomputer skills averaged 2.95 (on a scale of 1-7) for more access to microcomputers, and 2.72 (on a scale of 1-7) for higher future salary.

Of the students, 33% stated that they had been encouraged by members of the universtiy community to acquire microcomputer skills; 67% said that they had NOT been so encouraged. Of those who had been encouraged, 60% had been encouraged by their adviser, 44% by a course instructor, 6.7% by the department office, and all of them, 100% by their classmates!

Of the students surveyed, 52% said that they had no personal microcomputer resources available to them; 50% listed the Special Education laboratory/classroom; 75% said microcomputer resources were available in the dorms, 78% had access to computer resources in their permanent (parental) homes.

Of the students, 50% reported having no previous experience with microcomputers. Very few had had any systematic training in their use. To the question regarding the desire for more microcomputer course information 51% of the women (60/117) wanted information, and 100% of the men (4/4) wanted information.

Administrators

TABLE NO. 3
ADMINISTRATOR'S RESPONSES TO SURVEY QUESTIONS

Descr. of Variable	Sample Size	Sample Mean	Sample Variance	S. E. of Sample	Range	S.E.of Mean
Fam.Inc.	5	4.80	2.80	.748	4-6	.374
Higher Sal	8	3.125	16.878	2.905	1-6	1.098
Sch Int	8	5.25	13.503	1.299	3-7	.491
5 Yr Int	6	6.50	2.813	1.677	5-7	.75
Instruct.	7	3.286	23.17	1.819	1-6	.743
Fut. Instr	3	5.0	13.510	2.122	4-6	1.501
Teach.Exp.	7	18.286	863.43	11.106	9-35	4.534
Pres. Pos.	8	9.0	184.0	4.796	2-18	-
Age	8	40.25	391.57	8.599	30-62	3.250
Sal.(Thous)	7	40	1,409	14.188	19-60	5.793
Paid Worth	8	3.875	48.878	2.472	1-7	.934
Micro Int	8	6.25	7.504	.969	5-7	.366
Micr Skill	8	2.875	12.878	1.269	1-5	.480
Sch Cares	8	4.25	29.004	1.904	1-6	.720
Mic in Eval & New Staff	7	4.0	14.0	1.414	2-7	.577
Course Int	8	3.375	37.378	2.162	1-7	.817

As shown in Table No. 3, the administrators who returned the survey averaged more than 18 years of teaching experience and had been in their present positions a mean of nine years. Their average age was 40, with a range of 30-62: Half were female. Their average salary was $40,000, with a range of$19,000-$60,000.

Regarding their personal interest in using microcomputers in their profession, the administrators averaged a high rate of interest, 6.25 on a scale of 1-7. They rated their microcomputer skill level considerably lower, 2.875 on a scale of 1-7. Their expressed interest in taking a course in the use of microcomputers was 3.375 on a scale of 1-7.

Administrators perceived the family incomes in their districts to be somewhat above average (4.8 on a scale of 1-7). Administrators fell at

TABLE NO. 4.
COMPARISON OF MEANS OF TEACHERS, STUDENTS, AND ADMINISTRATORS

Descr. of Variable	Teachers Mean	Students Mean	Admin. Mean	Teachers Mean
Age	33.130	23.00	40.25	33.130
Dm =	9.33	16.45	7.12	
z =	14.201***	5.048***	2.153*	
Micro in Eval & New Staff	3.593	6.083	4.25	3.593
Dm =	2.49	2.083	1.361	
z =	8.864***	2.807*	2.637*	
Prof Int in Mic	5.524	6.117	6.25	5.524
Dm =	.593	.133	.726	
z =	2.965*	.319	1.984*	
Mic Skill	2.012	1.397	2.875	2.012
Dm =	.615	1.478	.863	
z =	9.012***	2.998*	1.747	
Course Int	5.090	6.431	3.375	5.090
Dm =	1.341	3.056	1.715	
z =	11.984***	3.621***	2.111*	

* Denotes significance at the .05 level.
** Denotes significance at the .01 level.
*** Denotes significance at the .001 level.

about the midpoint regarding whether their districts paid them what they were worth. They were somewhat weaker in their conviction that the districts could pay the teachers more. Their perception of the districts' concern or pressure on them to use microcomputers was about 4.25 on a scale of 1-7. Their rating of their districts' concern for the use of microcomputers as it would be reflected in teacher/administrator evaluations or in the choosing of new personnel was 4.0 on a 1-7 scale.

Comparisons among the groups of teachers, students, and administrators are shown in Table No. 4. The significance of differences between group means was tested using "z" ratios. The differences in the ages of the three groups are significant at the .05 level or higher in each case, as might be expected. Students perceived microcomputer skills as being significantly more important to obtaining a teaching position and being more highly evaluated than did either the teachers or administrators already in the field. Administrators perceived having these skills as being more important than did teachers. The difference between students and administrators in interest levels in learning microcomputer skills was not

TABLE NO. 5
COMPARISON OF MEANS OF TEACHERS AND ADMINISTRATORS

Descr. of Variable	Teachers Mean	Administr. Mean	Dm	S.E. of Dm	z	Level of Significance
Fam.Inc	4.033	4.80	.767	.385	1.99	.05
Higher Sal	5.013	3.125	1.888	1.107	1.706	-
Sch Int	5.124	5.25	.126	.505	.250	-
5 Yr Int	6.143	6.50	.357	.750	.476	-
Instruct.	3.838	3.286	.552	.754	.732	-
Fut. Instr.	5.490	5.0	.490	1.509	.325	-
Teach Exp.	9.105	18.286	9.181	4.558	2.014	.05
Age	33.130	40.25	7.12	3.307	2.153	.05
Sal(Thous)	18	40	22	5.805	3.790	.001
Paid Worth	2.451	3.875	1.424	.944	1.508	-
Micro Int	5.524	6.25	.726	.366	1.984	.05
Micro Skill	2.012	2.875	.863	.494	1.747	-
Sch Cares	3.593	4.25	.657	.735	.894	-
Mic in Eval	2.439	4.0	1.561	.592	2.637	.05
Course Int	5.090	3.375	1.715	.829	2.111	.05

significantly different. However, both of these groups' interest levels were significantly higher than that of teachers. Regarding the skill levels of the groups, teachers and administrators did not perceive themselves as significantly different, but both these groups were at higher skill levels

than the undergraduate students. Students reported the highest degree of interest in taking a microcomputer course. Their interest was significantly higher than that of either of the other groups. The teachers were the second highest group and were also significantly more interested in coursework than the group of administrators.

Table No. 5 provides a more complete comparison of the teachers' and the administrators' groups. Significant differences were found in their perceptions of family income level, their interest in microcomputers, and the criterion of microcomputer skill as part of teacher evaluation. There were also significant differences in their years of teaching experience, ages, salaries, and in interest in taking a microcomputer course.

Discussion/Implications

The sample of teachers appeared to be representative of the special education teachers in this mid-west state. Teachers believed that they were worth more than they were being paid, and that their school districts could afford to pay them more. The small sample of administrators believed that the ability of their districts to pay teachers more was less than the teachers supposed. Administrators also estimated a lower district income than did teachers.

Teachers interest in microcomputers was matched by their desire to enroll in coursework to learn these skills. Administrators were equally interested, but did not see coursework as the avenue of acquiring the skills they needed.

Teachers considered the microcomputer skills as related to their teaching of handicapped children more clearly than did the teacher trainees. These teacher candidates were quite diverse and naive in their perceptions of the value of having microcomputer skills. Administrators had different uses for the microcomputer than either of the other groups.

Teachers wanted at least part of their course costs to be paid by their district as would other courses or instruction. Their responses to questions concerning salaries indicated a longer-range view of finances than those of the students. Teachers suggested higher salaries as rewards for learning new skills, while the students wanted a much larger part of their immediate expenses paid and saw microcomputer skills as an added advantage in getting a teaching job.

Very few of the teachers indicated any fear of learning microcomputer skills, and few listed easy grading as an inducement. Students, on the other hand were very concerned about grading; 20% wanting easy grading, while 8% actually listed their fear as a deterrent. Since students see their grades as directly affecting their chances for employment, they hesitated to jeopardize their grade point average or chance getting a poor grade in a skill which they perceived as important to their employability.

More teachers than students had acquired some microcomputer instruction. Of the students 50% said that they had had no previous experience with the computer, although 78% stated that they had access to a computer in their parents' home - a revealing indication of the socio-economic class from which the large majority of our future teachers are coming. A gender difference was also obvious in the desire for microcomputer instruction: 51% of the women and 100% of the men students wanted such instruction.

Deterrents from learning microcomputer skills which were cited frequently by both teachers and students were a shortage of time, time conflicts and a doubtful availability of microcomputers.

Of the students only half had been encouraged by the University to enroll in a microcomputer course. Of these 60% had been so urged by their advisers; 44% by a course instructor. Since each student typically has five instructors during each semester, the number of professors taking an active role in encouraging students to acquire microcomputer skills appears to be very low. Only about 30% of the special education students had had such a course recommended to them by an adviser.

Both administrators and students reported higher interest in learning microcomputer skills than did the teachers. While the microcomputer skills needed by administrators vary from those needed by teachers, the administrators appeared to take a more relaxed and on-the-job approach to learning the skills and to the use of such skills in performance evaluation. Professionals already in the field with some experience perceived the need for microcomputer skills as less necessary than did the students, who were more concerned with getting employed in the field.

Special education undergraduate students are older (23.80 average), have higher grade point averages (3.03 on a 4.00 scale), and work more in addition to their class loads (7.8 hrs. per week average, range 0-48) than students of a decade ago. With the phenomenon of grade inflation, students' anxieties about having the best possible grades have escalated, as

indicated by their wanting guaranteed grades for trying something they perceived to be risky.

Of interest to Colleges of Education and the public in general is the finding of differences of opinions, perceptions, of the school environment and matrix, methods of acquiring knowledge, and socio-economic standings between teachers and administrators. Such division is built in and reinforced by the training institutions: Administrators and teachers seldom take the same kind of instruction, the same subject matter, the same academic approaches toward school problems, or even courses in which members of both groups interact. This separateness, especially when compounded with a typical unequal gender representation in the two groups, makes it very difficult for the two to work together or to perceive problems similarly. Colleges of Education reinforce this division, and that between regular and special education, by remaining divided into different departments with different faculty, philosophies, and resources. Since the unknown tends to be threatening, it is no wonder that these three groups eye each other watchfully and often distrustfully. Individual members of these three groups have learned well, been taught, to be this way.

Finally, the implications of this research as an experience in the rapidly changing world of technology are many. Between the time a proposal is written and funding obtained, or by the start-up date, the technical and prcedural delays, the completion, the write-up and finally publication, so many changes may have taken place in the technology, financial, social, professional, school and/or legislative conditions that the research results may have a lessened applicability and a smaller lasting value as products. Perhaps, in some cases, at this time, the primary value of the research is that which it generates by simply being in process. As one computer brand overtakes its competitor and as the strong effect of the band-wagon appears to be passing, the best laid plan of administrators and teachers and researchers often meet their fate under uncontrollable circumstances. The phenomenon of "future shock" seems nowhere to be more evident than in the field of microcomputers.

In summary, the results of this research indicate that both teachers and teacher candidates are aware of the desires of school districts for increased use of the microcomputer.

Teachers and administrators might be better prepared in settings where they can develop more similar attitudes and approaches to problem solving, and to understanding each other's roles, constraints, and parameters of responsibility.

Teachers and teacher candidates are deterred from taking microcomputer instruction by time problems and their doubt of adequate resources both in the schools and at the University. Students, in addition, have difficulty in imagining microcomputer uses, have greater grade and financial anxiety, and are more concerned with shorter range problems and rewards.

Inducements desired by both teachers and students for acquiring microcomputer skills were higher salaries and more access to microcomputers. More students also wanted free tuition and fees and more available sections of courses from which to choose. Requiring a microcomputer course or proficiency would solve the inducement problem for the teacher candidate group.

The lack of confidence in their ability to acquire technical skills handicaps too many teacher trainees. Our students who have taken courses have done well. No differences have been noted in skill acquisition between men and women students. Students who had been advised by both their adviser and by instructors were most likely to enroll in a microcomputer course. In our program to prepare teachers of the trainable mentally handicapped, three of the four full time faculty are actively engaged in microcomputer use/instruction/research. A higher per centage of these students have enrolled in microcomputer courses than those of other specialties. However, even this evidence is confounded by time pressures. In some specialties, almost every credit is prescribed: There are very few electives. In the specialty program for teachers of the trainable mentally handicapped, students have 13 elective hours in their professional program, higher than any other specialty in the program.

Introducing the students to the microcomputer through the advisement program and/or demonstration of applications in their specialty area has been an effective way to encourage enrollment. Special projects have been done well by students who have taken our course, but also by students who are self- or other-student taught.

Teachers, administrators and students all expect that the interest in and use of microcomputers will increase within the schools in the next five years. Such agreement indicates a strong likelihood that increased use will occur as more professionals have exposure and skill, whether provided by school districts or by Colleges of Education. This finding indicates the need to establish formal assurance of microcomputer skills in both teacher and administrative candidates.

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*This list was compiled from materials accumulated during the project, which was done with Apple computers. It is not intended to exhaustive. It should serve as a good "starter" listing.